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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/088,424	08/14/2002	Peter Kenington	46309/271492	9122

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MENDELSON AND ASSOCIATES PC
1515 MARKET STREET
SUITE 715
PHILADELPHIA, PA 19102

EXAMINER

JACKSON, BLANE J

ART UNIT	PAPER NUMBER
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2685

11

DATE MAILED: 09/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/088,424

Applicant(s)

KENINGTON ET AL.

Examiner

Blane J Jackson

Art Unit

2685

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 March 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 51-90 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 51-90 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2, 4, 10.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 51-53, 55-70 and 72-86 are rejected under 35 U.S.C. 102(b) as being anticipated by Briffa et al. (U.S. Patent 6,075,411).

As to claims 51, 52 and 70, Briffa teaches a lineariser for reducing distortion of the output signal which signal handling equipment produces in response to an analogue RF input signal, the lineariser comprising:

an extractor for extracting a portion of the input signal (figure 3, extractor is the splitter (34), column 5, line 54 to column 6, line 6),

a modifier for modifying the extracted signal to create non-linear components of reduced frequency therein (figures 3 and 4, within the PreD (37) are the modifier components: Input Detector (48) and (49), Variable Saturation Amplifier (VSA) (50), Variable Gain Amplifier (VGA) to yield a processed RF input which is split to a Squarer (52) for squaring the extracted signal, column 7, lines 34-65),

a generator for generating digitally a distortion signal from a delivered signal which is the modified signal (figure 4, the predistortion circuit PreD (37)), and

a combiner for combining the distortion signal with the input signal (figure 3, the Quadrature Gain Phase Adjuster (QGPA) (36), column 5, line 60 to column 6, line 26).

As to claim 53, Briffa teaches the combiner comprises a mixer for mixing the distortion signal into the input signal (similar to prior art of figure 2, the QGPA (14) with complex signal mixers, and described for figure 3: column 6, lines 13-26 and 37-40).

As to claims 55 and 72, Briffa teaches the generator is arranged to generate a number of distortion components which are susceptible of independent control (figure 3, the Controller (40) adjusts the predistortion signal coefficients, column 6, line 55 to column 7, line 13).

As to claims 56 and 73, Briffa teaches the generator comprises a splitter for splitting at least one distortion component into orthogonal components, each orthogonal component being susceptible of independent control (figure 4, the PreD (37) where the I and Q orthogonal signals are mixed with the two input signals (x) and (x) squared, column 6, lines 20-58).

As to claims 57 and 74, Briffa teaches the generator is arranged to combine a dc signal with the distortion signal (figure 3, Summers (38) and (39), column 7, lines 8-12).

As to claims 58 and 75, Briffa teaches wherein the generator produces a number of components and further comprises an adjuster for removing lower order components appearing in at least one of the components (figure 3, the Controller (40) adjust the predistortion signal coefficients (components), column 6, lines 55-58 and column 7, lines 5-8 and compensation for first, third and other order distortion terms: column 8, lines 10-30).

As to claims 59 and 76, Briffa teaches a lineariser according to claim 53 wherein the mixer comprises a splitter for splitting the input signal into orthogonal components (figure 2 QGPA (14) example mixer circuit, figure 3, Splitter (35), column 6, lines 37-40).

As to claims 60-62 and 77-79, Briffa teaches a lineariser according to claim 59 where the mixer mixes the distortion signal into one of the orthogonal input signal components (figure 3 where the "mixer" comprises the Splitter (35) and QGPA (36) to receive orthogonal distortion signal including a DC component to mix with the orthogonal input signal, column 6, lines 13-54).

As to claims 63 and 80, Briffa teaches a signal conditioner for conditioning the signal input to the generator so that the signal input maintains a substantially constant amplitude (figure 4, the PreD (37) includes a Variable Gain Amplifier (51) in the input signal path, column 7, lines 42-64).

As to claims 64 and 81, Briffa teaches a controller for adjusting a parameter of the distortion signal on the basis of feedback signal derived from the output signal (figure 3, Controller (40): column 6, lines 55 to column 7, line 5).

As to claims 65 and 82, Briffa teaches the distortion signal comprises a number of components and the controller is capable of exerting independent control over at least one of them (figure 3, coefficients adjusted from the Controller (40), column 6, lines 55-58).

As to claims 66 and 83, Briffa teaches the controller generates at least one non-linear component of the signal input to the generator for correlation with the feedback signal to produce signals to control parameters of the distortion signal or components thereof (figure 3, Controller (40) produces several complex orthogonal coefficients based on the feedback signal to send to the PreD (37) or generator, column 6, line 55 to column 7, line 13).

As to claims 67, 68, 84 and 85, Briffa teaches the controller divides the signal input to the generator into components, determines their amplitudes and correlates them with the feedback signal to produce signals to control parameters of the distortion signal or components thereof (column 6, line 55 to column 7, line 13).

As to claims 69 and 86, Briffa teaches wherein the signal handling equipment comprises an amplifier (figure 3, circuit for linearising a RF Power Amplifier (13), column 5, lines 3-7).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 54 and 71 are rejected under 35 U.S.C. 103(a) as being unpatentable over Briffa et al. (U.S. Patent 6,075,411) with a view to Kimura (U.S. Patent 5,404,378).

As to claims 54 and 71 with respect to claims 51 and 70, Briffa teaches a lineariser circuit for a RF PA but does not teach the generator comprises a data store wherein the data store is addressed by values of the delivered signal to responsively output corresponding values for the distortion signal.

Kimura teaches a distortion compensating circuit for a RF power amplifier where an initial value sufficient to provide a compensation is previously set in an addressed memory storage for storing distortion compensating data (figure 1, conventional: column 4, lines 10-55 and figure 6: column 8, lines 6-38). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Briffa with the coefficient addressed storage system of Kimura such that the convergence time of the distortion compensating effect is shortened.

5. Claims 87-90 are rejected under 35 U.S.C. 102(b) as being anticipated by Cavers (U.S. Patent 5,049,832).

As to claims 87-90, Cavers teaches a method and a lineariser for reducing distortion of the output signal which signals handling equipment produces in response to an analogue RF input signal, the lineariser comprising:

an extractor for extracting in portion of the input signal,

a modifier for modifying the extracted signal to create non-linear components of reduced frequency therein (figure 5, the square law detector between the extractor or sampled RF analog input and the RAM Lookup table (LUT)).

a generator for *generating digitally* a distortion signal from a delivered signal which is the extracted signal and,

a mixer for mixing the distortion signal into the input signal in a quadrature mixing process (figure 5 is a block diagram including the above functional elements, function with digital signal processing (DSP): column 18, lines 28-59).

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. McNicol et al. (U.S. Patent 5,193,224) discloses an adaptive phase control for a power amplifier pre-distorter. Wessel et al. (U.S. Patent 6,275,685) discloses a circuit to pre-distort and cancel the AM-AM and AM-PM distortion of a power amplifier for improved spectral output purity for 3G cellular systems. Nojima (U.S.

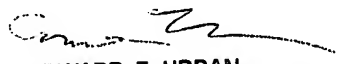
Patent 4,943,783) discloses a feed forward distortion correction circuit for a power amplifier.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Blane J Jackson whose telephone number is (703) 305-5291. The examiner can normally be reached on Monday through Friday, 8:00 AM-5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Urban can be reached on (703) 305-4385. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BJJ


EDWARD F. URBAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600